CORPORATE RISK REPORTING

A Content Analysis of Narrative Risk Disclosures in Prospectuses

Rogier Deumes
Maastricht University

This study examines whether companies report risk-relevant information to prospective investors. While corporate risk communication is important for the well-functioning of capital markets, our current understanding of risk reporting practices is limited. The sample consists of Dutch companies raising capital on the Amsterdam Stock Exchange in the late 1990s. In this setting, companies had much discretion in writing the risk section of the prospectus. After a detailed content analysis of the risk sections, the author demonstrates that a measure of risk extracted from these texts successfully predicts the volatility of companies' future stock prices, the sensitivity of future stock prices to market-wide fluctuations, as well as severe declines in future stock prices. Overall, these results support the view that prospectuses of Dutch companies provide adequate information about material investment risks.

Keywords: *corporate reporting; narratives; risk; new issues; content analysis*

> Our history of substantial net losses may continue indefinitely and make it difficult to fund our operations.
>
> VersaTel Telecom International N.V. (1999, p. 12)

This excerpt comes from the so-called "risk factor" section in the initial public offering prospectus of VersaTel Telecom International. It provides an example of warnings (risk factors) that corporate managers communicate to buyers of shares in companies going public. Offering prospectuses are legal documents, describing an enterprise to prospective investors. The risk factor sections in these documents are intended to provide investors with a clear and concise summary of the material risks to an investment in the issuers'

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securities. As such, these sections have the potential to alter investors' risk judgments and promote sound investment decisions. Because there is little empirical evidence on the information content of the risk factor sections, the aim of this article is to explore if these texts actually contain risk-relevant information for investors. For this purpose, I use a sample of 90 prospectuses of Dutch companies and perform a detailed content analysis of the textual information in the risk factor sections. Next, I examine to what extent an aggregate risk measure extracted from the information in the texts successfully predicts future volatility of stock prices, the sensitivity of stock prices to marketwide fluctuations, as well as large declines in future stock prices.

To facilitate linking the study to the communication practices of corporate managers and their advisors, I assume a financial communication perspective in this article.[1] Foremost, studying current risk disclosure practices can make clear to financial communication practitioners if risk reporting in prospectuses can be viewed as an area of best practice for corporate risk communication. The latter has been suggested by professional bodies like the Institute of Chartered Accountants in England and Wales (ICAEW), who see great merit in better risk reporting (ICAEW, 1999). Based on an exploratory study of a small number of prospectuses and annual reports of U.K. companies, the ICAEW put forward that companies provide limited risk information in annual reports but make more extensive risk disclosures in prospectuses. Following up on this research, this study more formally tests the claim that risk disclosure in prospectuses provides risk-relevant information to investors.

While this article views risk disclosure in prospectuses through a financial communication lens (focusing on shareholder relations and shareholders' concerns about investment risk), two issues need to be stressed before proceeding. First, corporate communication is part of larger organizational systems (Suchan & Charles, 2006). Other business functions traditionally involved with financial communication include finance and accounting (Argenti, 1996). Beside corporate communication research, I therefore draw on research in these disciplinary areas to study risk disclosure practices in prospectuses. Second, the broader topic of risk communication that this paper deals with clearly links to other subfunctions of corporate communication, including media relations, employee relations, community relations, and crisis communication. Within the field of public relations research, for example, many studies have focused on employees' and communities' concerns about health, safety, and environmental risks. Palenchar and Heath (2007) provide a concise summary of this growing branch of risk communication research, in which the stakes for participants in the communication process are evidently high (Kostelnick, 2007).

The remainder of this article is organized as follows. The next section discusses the motivation of the article and summarizes prior research. Section 3 provides a brief background and formulates the research question. Section 4 outlines the research design. Section 5 presents the results. The final section summarizes the results, discusses certain limitations, and considers potential implications of the study.

MOTIVATION AND PRIOR RESEARCH

Studying risk disclosure is important because corporate transparency about risk is vital for the well-functioning of capital markets. To achieve and maintain an accurate valuation of a company's stock, confident and well-informed investors are necessary. Lacking adequate disclosure, managers have superior information to outside investors, who may not fully understand the underlying risks and rewards of a firm's business (Hutton, 2004). By providing investors with information about the risk associated with pursuing the company's strategic goals, managers can increase transparency and eliminate disparities between what investors understand and expect and what management can deliver. This disclosure enables investors to make more accurate corrections for risk when they value their investments, thereby preventing stock prices from becoming unhinged from intrinsic business value (i.e., prevent them from becoming critically higher than they would be if the market had the information that is available to managers).[2] According to Fuller and Jensen (2002), "Trying to mask the uncertainty that is inherent in every business is like pushing on a balloon; smoothing out today's bumps means they will only pop up somewhere else tomorrow, often with catastrophic results" (p. 43). Consequently, being clear about the risks and uncertainties involved can prevent severe damage to the reputation and long-term health of a company that may otherwise result from overvalued corporate equity (Fuller & Jensen, 2002).

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Recognizing the potential benefits of risk disclosure to investors and the long-run health and reputation of a company, an important question becomes whether managers are forthright about the underlying risks in their firms' business. On the one hand, they may understand the benefits of risk disclosure and realize that markets will penalize companies that provide inadequate information relative to their peers. As a result, an increasing number of managers may perceive that risk disclosure is a competitive advantage in attracting capital. Furthermore, managers may fear litigation and reputation costs if they do not provide sufficient risk information to investors (Skinner, 1994, 1997). On the other hand, being candid about risk can cause the stock price to fall to a more sustainable level in the short run. Short-sighted managers may not recognize that the associated pain of this is slight compared to that arising from colluding in myth-telling (Fuller & Jensen, 2002). Additionally, disclosure is not a costless undertaking (Botosan, 1997). First, creating and distributing timely and accurate risk information consumes valuable management time. Second, managers may perceive that there is a cost imposed on the firm by competitors who exploit the information to the detriment of the disclosing firm. Third, there is the possibility of litigation in connection with a disclosure. Finally, companies may be afraid to set a disclosure precedent they cannot stick to (Hutton, 2004).

Prior Research

Corporate reporting has generated broad interest from business communication researchers. Whereas some studies have investigated graphical presentations of financial information (e.g., Courtis, 1997; Frownfelter-Lohrke & Fulkerson, 2001) and photographs (Anderson & Imperia, 1992), many studies have examined narrative portions of annual reports, mostly the president's letter to shareholders and management's discussion and analysis. The focus in these studies varies considerably and includes analyses of readability (Courtis & Hassan, 2002; Subramanian, Insley, & Blackwell, 1993), positive and negative words and negative messages (Crombie & Samujh, 1999; Hildebrandt & Snyder, 1981), thematic differences (Kohut & Segars, 1992), linguistic structures (Thomas, 1997), rhetorical elements and symbolic meaning (Hyland, 1998; Prasad & Mir, 2002), verbal tone (Ober, Zhao, Davis, & Alexander, 1999), and genre (Rutherford, 2005). Focusing on different aspects, several researchers have investigated if past or current performance of a company is reflected in the texts of corporate reports (Hildebrandt & Snyder, 1981; Kohut & Segars, 1992; Rutherford, 2005;

Thomas, 1997). Contributing to this literature, I investigate to what extent texts of corporate reports reflect future outcomes.

Several findings in prior business communication research are relevant for this study. First, managers seem predominantly optimistic in their writing (Hildebrandt & Snyder, 1981; Rutherford, 2005), seeking to create a positive perception of themselves and their companies (Hyland, 1998). Arguably, a bias toward the positive (the so-called "Pollyanna effect") may hinder managers in providing effective warning signals. Essentially, providing investors with information about risk demands explicit attention for the downside. Second, Crombie and Samujh (1999) present a case of an executive who did focus on problems in his letter to shareholders. The problems discussed were, however, relatively minor and seemingly intended to distract attention from more serious issues, thereby likely causing longer term credibility problems (Crombie & Samujh, 1999). This case recalls the assertion that what is omitted is as significant as what is included in a narrative (Jameson, 2000). In the context of risk factor disclosure, texts that describe every minor risk (without considering the likelihood and potential impact) can obscure major risks. Third, Kohut and Segars (1992) find a predominant emphasis on the past and conclude that executives feel more confident discussing a certain past than an uncertain future in their letter to shareholders. This can further hinder providing risk-relevant information.

In the field of accounting, prior risk disclosure research has almost exclusively focused on quantified risk disclosure in financial statements and on specific categories of risk, especially market risk (e.g., Jorion, 2002; Linsmeier & Pearson, 1997; Rajgopal, 1999; Thornton & Welker, 2004), thereby overlooking narratives and possible interrelationships among many types of risk that are present in an organization's environment.[3] Notable exceptions of studies in accounting and finance that have examined the relation between risk-related information extracted from narratives and future outcomes are Abrahamson and Amir (1996) and, more recently, Li (2006). The results of both studies suggest that risk-related information in text can be used to assess future firm performance. Abrahamson and Amir (1996) measure the information contained in the president's letter to shareholders in annual reports by counting the relative number of words with a negative connotation used in a negative context. In this way, they focus on linguistic style (how it is being said) rather than linguistic content (what is being said). Assuming that words convey information independent of their semantic context, Li (2006) measures emphasis on market risk in annual reports by counting the frequency of words related to risk and uncertainty. Li argues that in a general setting such as

annual reports, a context-specific measure of risk is difficult to establish at this stage. A limitation of both studies is that only very few words could actually be classified as expressing negativity or risk (0.4% and 0.04%, respectively). Taking a different approach, this article extracts the content of risk-related information in texts of risk sections relative to the particular context of their use.

BACKGROUND AND RESEARCH QUESTION

For standard setters, the burst of the Internet and telecom bubble and the unanticipated subsequent collapse of large companies with a false image of being low risk and highly predictable (e.g., Enron) created an urgency to reconsider the set of requirements for disclosure of relevant and understandable forward-looking information about risk. As a result, narrative risk factor disclosure is nowadays increasingly required in periodic reports (both annual and quarterly) by law or formal codes of best practice in corporate governance worldwide. In prospectuses, regulators have long since required firms to provide, under the caption "risk factors," a concise and logically organized discussion of the most significant factors that make an offering speculative or risky. This requirement offers the opportunity to examine whether these documents actually contain risk-relevant information.

A potential problem when regulating risk factor disclosure is that much of the risk information is industry- and company specific and that the most relevant information changes constantly, as a result of rapid economic and technological changes. As put aptly by Hutton (2004), "Relevant information does not lend itself to standardization" (p. 9). Recognizing this problem, most standard setters allow firms a large degree of discretion in drafting risk sections. The narratives must explain in simple language how certain risk factors affect the company but should exclude risk factors that could apply to any company. Furthermore, it is up to preparers of risk sections to decide which risk factors are significant and should therefore be discussed. Consequently, some have argued that risk sections do not contain reliable information, because the rules are "subjective, open-ended and ambiguous, which allows firms to report almost anything (or nothing) without violating the requirements" (Schrand & Elliot, 1998, p. 274). Others have also questioned the qualitative nature of the information provided in risk sections. Quantification of risk disclosure, in contrast, is

viewed as beneficial "because it improves the credibility of the disclosures and makes them ex-post verifiable" (p. 280). Hodder, Koonce, and McAnally (2001) maintain that narrative risk disclosures do not compensate for the lack of quantitative risk information because "even if companies do disclose this information, it is very difficult, if not impossible, for individuals to use this qualitative information to generate their own quantitative risk assessments" (p. 63). Concerns about the narrative nature of risk factor disclosure may be unwarranted, though. Prior research shows that textual information can help investors better predict future firm performance (Abrahamson & Amir, 1996; Li, 2006). Vanstraelen, Zarzeski, Marilyn, and Robb (2003) further document that a higher level of forward-looking non-financial disclosure in annual reports is associated with lower dispersion and higher accuracy in financial analysts' earnings forecasts.

While current risk disclosure rules indeed depend on managers' willingness to actively disclose the right information, risk sections in prospectuses might contain reliable information for two related reasons. First, due to the high information asymmetry when raising capital from outside investors, market participants and regulators insist on the disclosure of material information in prospectuses, especially when it concerns an initial public offering (Jog & McConomy, 2003). Second, the information contained in a prospectus is the joint product of several parties. Underwriters (usually investment banks) function as intermediaries between the company and investors and coordinate drafting of the prospectus. Other parties involved in preparing the prospectus are auditors and lawyers. While auditors provide assurance to the issuers' financial statements, lawyers advise on the disclosures required in the narrative sections, including the risk section (Draho, 2004). The heightened litigation and reputation risk for all parties involved leads to intense scrutiny, more so than for annual reports (Hribar, 2004).

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Research Question

The lack of empirical evidence on the informative nature of narrative risk disclosures motivates me to explore the following research question: Do the texts of risk factor sections in prospectuses contain risk-relevant information for investors? To address this research question, I followed a two-stage approach. First, I extracted a reliable aggregate measure of risk disclosure from the texts. Second, I examined whether this measure was associated with a number of outcomes in the period after publication of the prospectus: (a) future total return risk (volatility of the stock price); (b) future systematic risk (sensitivity of stock price to market-wide fluctuations); and (c) the likelihood of severe declines in stock price.

Finding a significantly positive association between the risk disclosure measure obtained from the texts and the above-mentioned outcomes would demonstrate that companies that turn out relatively risky ex-post are generally disclosing more risk ex-ante. Alternatively, finding a significantly negative association would show that companies that turn out relatively risky ex-post are generally disclosing less risk ex-ante. While the former would support the claim that managers are actively providing risk-relevant information in risk sections (i.e., the texts represent what they purport to represent), the latter would indicate that managers are actively withholding risk information.[4]

RESEARCH DESIGN

The data that I used in this study were obtained from 90 prospectuses of Dutch firms that issued securities on the Amsterdam Stock Exchange in the period from 1997 to 2000.[5] More specifically, the sample includes 49 (54%) initial public offerings (IPOs) of common stock, 31 (34%) seasoned offerings of common stock and/or convertible bonds, and 10 (11%) stock offerings relating to a merger or demerger.

The information required in a prospectus is set out in the listing and issuing rules of the Amsterdam Stock Exchange. While the regulations require a risk assessment to be included in the prospectus, they provide no further guidance on the nature, degree, and form.[6] This lack of guidance allows companies and other parties involved in writing the risk sections a large degree of freedom in expressing their judgment. The cover of the prospectus typically refers to the risk section as "certain factors that should be carefully considered by prospective investors."

The stock market data required for this study (i.e., monthly stock price data and value-weighted index data) were retrieved from the financial database "DATASTREAM."

Institutional Setting

While the Dutch capital market is well-developed, the institutional environment in the Netherlands has some unique characteristics that likely affect the quantity and quality of corporate disclosure in general.[7] First, Dutch companies make extensive use of anti-takeover mechanisms (De Jong, Kabir, Marra, & Röell, 2001; Kabir, Cantrijn, & Jeunink, 1997), thereby reducing the threat that management is replaced by a raider. In corporate control models, this threat disciplines managers (e.g., Grossman & Hart, 1980). Consequently, Dutch managers likely face lower pressure from the capital market to publicly account for their performance via corporate reports. Second, like in some other Continental European countries, Dutch firms have a two-tier board structure (Douma, 1997). To the extent that this results in better monitoring of management's performance by independent boards, there could be less need for monitoring by outside shareholders and, consequently, less incentives for management to publicly disclose information. Third, management or large shareholders often hold large parts, or even the majority, of outstanding shares (De Jong et al., 2001; Kabir et al., 1997). Large shareholders are often thought to have better access to operational information (i.e., lower information asymmetry) and have higher incentives to monitor management's performance (e.g., Schleifer & Vishny, 1986). Managerial ownership better aligns the interests of management and shareholders (e.g., Jensen & Meckling, 1976). Economic theory predicts that both the alignment of interests and better monitoring by large shareholders reduce potential problems between management and shareholders (e.g., Jensen & Meckling, 1976), thereby reducing the need for public reporting. Consequently, the overall institutional environment in the Netherlands seems to make it less evident in advance that management discloses relevant information to outside investors. From an international perspective, the Dutch environment is therefore an interesting setting to study disclosure practices.

The time period in which this study is conducted is also interesting, because public equity markets in the late 1990s seemed willing to invest in high-risk companies that never made profits and might never do so. Although the new prospects looked very promising, with the benefit of hindsight the risks of investing in these companies were not clear at the

time. This situation makes it particularly relevant to examine whether the risk sections in prospectuses actually reflected the material risks.

Extracting an Aggregate Measure of Risk (RDS)

In previous research on IPOs, the number of risk factors described in the risk section of the prospectus is a common proxy for ex-ante risk (e.g., Beatty & Welch, 1996; Beatty & Zajac, 1994; Feltham, Hughes, & Simunic, 1991; Simunic & Stein, 1987). A simple count of these risk factors combines them into one single measure that is comparable to a summated scale.[8] An advantage of this approach is that it does not focus on one particular risk, that is, isolating specific risks to the exclusion of other possibly interrelated risk factors. However, a disadvantage of adding up (different) risk factors is that unidimensionality and internal consistency of the risk factors are assumed but cannot be tested for. Unidimensionality and internal consistency are essential requirements for a composite measure and imply that the composite measure should consist of risk factors that load highly on one single dimension (Hattie, 1985; McDonald, 1981) and are strongly associated with each other, representing a single concept (Nunnally, 1978). For a multifaceted concept like risk, however, unidimensionality and internal consistency are not realistic assumptions when simply counting the number of risk factors disclosed in the risk sections of the prospectuses.

Instead of a mere count of the number of risk factors, the alternative approach taken in this study is to investigate the attributes of the risks described. A discovery-oriented procedure known as content assessment was applied first. The purpose of this procedure was to take an open-ended look at the risk sections across prospectuses to make a preliminary identification of the kinds of risk that are described. Next, a content analysis was undertaken to systematically evaluate the content of the risk sections.

The content analysis involved three broad stages: (a) development of an appropriate coding scheme that lists the expected risk factors that are disclosed in the risk sections; (b) coding of the texts of the risk sections; and (c) reduction of data into composite measures of risk disclosure. Each stage is discussed below in more detail.

Coding scheme. In the first stage, a wide range of literature on risk and risk management was used to develop an appropriate coding scheme that lists broad content categories and different risk factors related to these categories (see Miller, 1992, for an overview of this literature and a similar categorization of risk). Column 1 of Table 1 summarizes the final coding

scheme by listing the names of the broad categories and accompanying risk factors. Each risk factor of the coding scheme is described by a number of words or phrases that detail the meaning of the risk factor. Typical examples of risk factors per category are provided in the Results section, which also further explains Table 1.

Coding procedure. In the second stage, I matched the words and phrases in the texts of the risk sections with the coding scheme and identified for each text whether or not the risk factor was mentioned. A pretest was performed on a subset of the sample, providing further understanding of the textual disclosures. As a result, several risk factors of the coding scheme were refined and others were added. Using the improved coding scheme, the coding process was applied to the full sample.

An advantage of this manual approach over a computer-aided content analysis is that humans can better judge the meaning of words and phrases within a context. A disadvantage is that a manual approach is less cost-effective and flexible. In addition, human raters can make mistakes and are prone to researcher bias (Krippendorff, 2004). To assure the reliability of the coding process, two trained, independent raters coded the texts. Percentage agreement for the risk factors ranged from 83% to 100%. Perreault and Leigh's (1989) interjudge reliability index ranged from .82 to 1.00, where .80 (and .70 in exploratory research) is considered a lower limit. All coding discrepancies were resolved by jointly reexamining the texts and determining an appropriate identification.

Data reduction. The third stage of the content analysis concerned a statistical reduction of the collected data (48 dichotomous variables for each firm in the sample, each variable representing a different risk factor) into a smaller set of new, composite dimensions or component scores with a minimum loss of information. While the nature and character of the original data are retained, a smaller set of composite measures enables subsequent multivariate empirical analyses.

The technique that was used for this purpose is principal components analysis by alternating least squares optimal scaling (PRINCIPALS).[9] Compared to standard principal components analysis, which assumes linear relationships between numeric variables, PRINCIPALS allows variables to be scaled at the nominal or ordinal level. In addition, the method substantially increases the number of variables that can be included in the analysis, given a certain sample size. PRINCIPALS is used as an exploratory technique that does not set any a priori constraints on the

Table 1. Overview of Risk Disclosures and Results of Principal Components Analysis by Alternating Least Squares Optimal Scaling (PRINCIPALS)

Risk Factor	*% of Reported Risk Factors*	*% of Firms Reporting on Factor*	*Component Loadings on Dimension*		
			1	*2*	*3*
Macro environmental sources	22				
Economic					
General economic conditions		78	—	—	.74
Currency, interest, and price fluctuations		61	—	—	.40
Political		30	—	—	—
Social and environmental		11	—	—	—
Regulation and legislation		69	.58	—	—
Technological change		44	.56	—	—
Industry sources	29				
Competition		74	.57	—	—
Potential entrants		37	.56	—	—
Substitutes		31	.53	—	—
Suppliers		35	—	—	.49
Strategic partners		37	.60	—	—
Customers					
Market acceptance		12	.59	—	—
Dependence on clients		48	—	—	—
Changing client requirements		19	—	—	.45
Seasonality demand		20	—	—	—
Personnel		63	—	.51	—
Internal sources	29				
Dependence on management		60	—	—	—
Dependence on product		14	—	—	—
Research and development		41	.56	—	—
Intellectual property rights		31	.53	—	—
Product defects		19	—	—	—
Liability		46	—	.50	—
Accounts receivable		16	—	—	—
Information systems and controls		13	—	—	—
Limited flexibility cost structure		16	—	—	—
Debt covenants		11	.55	—	—
Excessive debt		12	.53	—	—
Management of growth		41	—	.66	—
Acquisitions, alliances, and joint-ventures		69	—	—	—

(continued)

Table 1. (continued)

Risk Factor	*% of Reported Risk Factors*	*% of Firms Reporting on Factor*	*Component Loadings on Dimension*		
			1	*2*	*3*
Other sources	5				
Millennium		43	—	—	—
Euro		20	—	—	—
Loss and probability of loss	3				
History of losses and expectation to continue to incur losses		11	.69	—	—
Dilution due to future sale of shares		22	.72	—	—
Variance	3				
Volatility of share price		20	.76	—	—
Variability of operating results		16	—	—	.54
Lack of information	5				
Limited operating history		11	.52	—	—
Accuracy of forward-looking statements		10	.55	—	—
Absence of prior public market		51	—	.63	—
Lack of control	5				
Takeover defenses		15	.40	—	—
Influence of large shareholder		45	—	—	—
Cronbach's coefficient alpha			.91	.85	.82
Eigenvalue			11.82	6.04	5.37
% total variance			24.62	12.59	11.19

Note: Shown are risk factors that were reported by at least 10% of the firms in the sample. Component loadings are shown when exceeding .40.

estimation of components or the number of dimensions to be extracted. Theoretical support or prior research that justifies a confirmatory approach is currently lacking. Hence, an exploratory approach is considered most useful as a data reduction method.

The data reduction procedure resulted in three component scores that were named Risk Disclosure Score 1, 2, and 3 (RDS1, RDS2, and RDS3). The following section provides detailed results on these component scores. Because RDS1 explains about twice as much variance of the risk factors as RDS2 and RDS3 and represents far more risk factors than RDS2 and RDS3, the main analyses focus on RDS1. Supplementary analyses considered RDS2 and RDS3.

Association Between RDS1, Total Return Risk, and Systematic Risk

Total return risk (TRR) is commonly defined as the standard deviation of stock returns. Systematic risk (BETA) is defined as the covariance of stock returns and returns on the market portfolio, divided by the variance of returns on the market portfolio (Fama & MacBeth, 1973). A value-weighted index of all stocks listed on the Amsterdam Stock Exchange is used to calculate the returns on the market portfolio. To investigate the association between RDS1 and future TRR and future BETA, I estimate the following models for the full sample:

$$\text{TRR}(+T) = \beta_0 + \beta_1 \text{ RDS1} + \varepsilon \quad (1)$$

$$\text{BETA}(+30) = \beta_0 + \beta_1 \text{ RDS1} + \varepsilon \quad (2)$$

In Model 1, TRR(+T) represents future TRR and was calculated using T observations of monthly stock returns after publication of the prospectus (at least 6 and at most 30 observations of monthly stock returns). BETA(+30) in Model 2 represents future BETA and was calculated using 30 observations of monthly stock returns after publication of the prospectus.[10]

For a subsample of firms with a seasoned offering and, consequently, a history of stock returns, I additionally estimated the following models:

$$\text{TRR}(+T) = \beta_0 + \beta_1 \text{ RDS1} + \beta_2 \text{ TRR}(-18) + \varepsilon \quad (3)$$

$$\text{BETA}(+30) = \beta_0 + \beta_1 \text{ RDS1} + \beta_2 \text{ BETA}(+30) + \varepsilon \quad (4)$$

In Model 3, TRR(–18) represents past TRR and was calculated using 18 observations of monthly stock returns before the publication of the prospectus. BETA(–30) in Model 4 represents past BETA and was calculated using 30 observations of monthly stock returns before publication of the prospectus. Both TRR(–18) and BETA(–30) were viewed as alternative forecasts of future risk and were used as a benchmark for RDS1.

Association Between RDS1 and Severe Declines in Stock Price (FAIL)

Riskier firms can be expected to have a higher probability of extreme negative outcomes, particularly if managers typically associate risk with negative outcomes (March & Shapira, 1987). For a sample of IPO firms, Hensler, Rutherford, and Springer (1997) find that a simple count of the number of risk factors listed in the offering prospectus is significantly

related to the failure to survive in the aftermarket, which is defined as delisting from the trading exchange for negative reasons, for example, a stock price below the acceptable level (so-called "penny stocks"). Listing and issuing rules of the Amsterdam Stock Exchange, however, do not require delisting of firms in case their stock price falls below five Euro or even one Euro. For this reason, I defined stock price failure as stocks trading at a price below one or five Euro, 30 months after publication of the prospectus [FAIL1(+30) and FAIL5(+30)]. For the full sample, I estimated the following model:

$$FAIL(+30) = \beta_0 + \beta_1 RDS1 + \varepsilon \quad (5)$$

Control Variables

I used a number of control variables in the models outlined above. To control for firm size, I added the variable SIZE, which is defined as the natural logarithm of the market value of the firm in million Euro one month after publication of the prospectus. To control for industry effects, I added an indictor variable IND that is equal to one if the firm operates in a high-risk industry (information technology, biotechnology, or telecommunication), and zero otherwise. In the models estimated for the full sample, I also controlled for the type of offering by adding an indicator variable IPO that is equal to one for IPO firms, and zero otherwise.[11]

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RESULTS

This section addresses five areas: content analysis of risk sections, predicting TRR and BETA, predicting FAIL, supplementary analysis, and robustness checks.

Content Analysis of Risk Sections

The content analysis reveals that management mostly assigned the label "risk" to factors, either external or internal to the firm, that could adversely impact future firm performance. In this sense, risk actually referred to sources of downside risk. In no single risk section did management refer to risk as being associated with the probability of high performance. These findings confirm March and Shapira's (1987) observations of high-level executives' risk perceptions.[12]

The first column of Table 1 provides a detailed overview of the kinds of risk that were identified in the risk sections of the prospectuses. In accordance with Miller's (1992) integrated risk framework, I broadly classified the sources of risk as related to the following: (a) the macro environment; (b) the industry environment; (c) the internal environment of the firm; and (d) other.

Apart from describing sources of risk, management's discussion of risk frequently resembles investors' conceptualization of risk as surveyed by Baird and Thomas (1990) and Olsen (1997).[13] For this reason, I discerned four additional categories:

- Loss or probability of loss; for example, "We have a history of losses and expect to continue to incur losses in the foreseeable future," "The share price may decrease due to future sale of shares," "Shares purchased in this offering will be diluted immediately because the initial offering price is substantially higher than the book value per share."
- Variance; for example, "Our share price may be volatile," "Our operating results may be subject to significant fluctuations."
- Lack of information; for example, "Limited relevance of historic activities and financial performance," "Our forward-looking statements may not be accurate," "Lack of operating history."
- Lack of control; for example, "Anti-takeover provisions may prevent a beneficial change of control," "Control by principal shareholder."

The second column of Table 1 displays for each risk factor the percentage of firms that reported on a particular factor. The four most frequently reported risk factors, in order of frequency of reporting, were the following:

- General economic conditions (78%); for example, "Sensitivity of results to economic developments," "Fluctuations in the general economy."
- Competition (74%); for example, "We operate in a highly competitive industry."

- Regulation and legislation (69%); for example, "The company's ability to commercialize its products depends upon its compliance with government regulations," "Unexpected changes in regulatory requirements could adversely affect our business."
- Acquisitions, alliances, and joint-ventures (69%); for example, "Costs and difficulties of acquiring and integrating businesses could impede future growth," "No assurance can be given that desired acquisitions and alliances will be available."

Aggregating the reported risk factors per category, the most frequently disclosed risk factors appeared to be related to the industry environment and the internal environment of the firm (both 29%), followed by the macro environment (22%) and the other categories (20% in total).

Table 1 also presents the results of the statistical reduction of the collected data using PRINCIPALS. As expected, the risk disclosures were not unidimensional. I extracted three dimensions that together accounted for 48% of the variance of the risk factors. The eigenvalues were used to decide how many dimensions should be used in the analysis.[14] Using a plot of the eigenvalues (so-called "scree test"), all dimensions were retained with eigenvalues in the sharp descent part of the plot before the eigenvalues started to level off. Component loadings exceeding .40 are considered important; if the component loadings are .50 or greater, they are considered practically significant (Hair, Anderson, Tatham, & Black, 1998). The squared loading reflects the amount of a risk factor's total variance that is accounted for by the component score.

For each dimension, component loadings exceeding .40 are displayed in Table 1. Higher component loadings represent a higher correlation of the risk factor and the component score. As can be seen, the component loadings were scattered across the eight categories. Dimension 1 had the highest eigenvalue (11.82) and accounted for 25% of the variance of the risk factors. The component score of Dimension 1 was simply named Risk Disclosure Score 1 (RDS1). Conceptually, RDS1 represents the degree to which each firm in the sample reported on the group of risk factors that had high loadings on Dimension 1. Thus, the more disclosure of risk factors with high loadings on Dimension 1, the higher RDS1. As can be seen in Table 1, management's warning for future volatility of the share price had the highest component loading on Dimension 1 (.76), followed by the possibility of dilution of the share price (.72), a history of losses and the expectation to continue to incur losses (.69), and dependence on strategic partners (.60). Twelve other frequently reported risk factors have loadings between

.50 and .60. Cronbach's coefficient alpha assessed the internal consistency of RDS1, and its value of .91 was well above the generally agreed lower limit of .70 (Robinson, Shaver, & Wrightsman, 1991). Hence, RDS1 was a statistically reliable composite measure.

Dimensions 2 and 3 accounted for 13% and 11% of the variance of the risk factors, and the component scores were RDS2 and RDS3, respectively. Conceptually, RDS2 and RDS3 represent the degree to which each firm in the sample reported on the group of risk factors that had high loadings on Dimensions 2 and 3. Management's warning about their ability to manage growth had the highest component loading on Dimension 2 (.66), followed by absence of a prior public market (.63). Only two other risk factors had loadings between .50 and .60 on Dimension 2. The most frequently reported risk factor, general economic conditions, loaded highly on Dimension 3 (.74). Only one other risk factor had a loading between .50 and .60 on Dimension 3. Cronbach's coefficient alphas of RDS2 and RDS3 were adequate, suggesting that RDS2 and RDS3 were also statistically reliable composite measures.

Although PRINCIPALS reduced the widely diverse risk disclosures into three unidimensional and statistically reliable composite measures of risk disclosure (which was the main purpose of the data reduction procedure), it is unclear what caused the different dimensions in the risk disclosures. Because RDS1 explained about twice as much variance as RDS2 and RDS3 and represented far more risk factors (16 component loadings above .50 compared to 4 and 2 for RDS1 and RDS2, respectively), the main empirical analyses focused on RDS1. Supplementary analyses (see below) considered RDS2 and RDS3.

Table 2 displays the descriptive statistics of RDS1 for the full sample. Due to the statistical procedure that was used to construct the variable, RDS1 had a mean of zero and standard deviation of one. Table 2 also shows the descriptive statistics of RDS1 for separate subsamples of seasoned and unseasoned offerings, and high-risk and low-risk industries. Additional tests showed that the difference in RDS1 for seasoned offerings and unseasoned offerings was significant ($p < .05$), indicating that management makes more extensive risk disclosures in the case of an initial public offering. In addition, firms in a high-risk industry had significantly higher RDS1 ($p < .01$).

Table 2 further displays the descriptive statistics of all test and control variables. The total number of observations N decreased in the period after the offering due to delisting of firms that merged or were taken over.

Table 2. Descriptive Statistics of All Variables

Variable	*Sample*	N	M	*Median or %*[a]	SD	*Min.*	*Max.*
Measure of risk disclosures							
RDS1	all prospectuses	90	.00	–.41	1.00	–1.03	2.99
RDS1	initial public offerings	49	.23	–.30	1.04	–.95	2.99
RDS1	seasoned offerings	31	–.18	–.69	.98	–.96	2.64
RDS1	high-risk industry	35	.43	–.06	1.15	–.81	2.75
RDS1	low-risk industry	55	–.29	–.49	.78	–1.03	2.99
Ex-post measures of equity risk							
TRR (+6)	all prospectuses	90	.14	.12	.08	.02	.49
TRR (+12)	all prospectuses	89	.15	.14	.09	.05	.46
TRR (+18)	all prospectuses	86	.15	.13	.08	.05	.41
TRR (+24)	all prospectuses	84	.15	.14	.08	.05	.39
TRR (+30)	all prospectuses	80	.14	.13	.06	.05	.37
BETA (+30)	all prospectuses	80	.86	.74	.51	.01	1.99
TRR (+6)	seasoned offerings	31	.12	.11	.06	.04	.31
TRR (+12)	seasoned offerings	31	.14	.10	.09	.05	.46
TRR (+18)	seasoned offerings	31	.13	.12	.07	.05	.35
TRR (+24)	seasoned offerings	31	.13	.11	.06	.06	.32
TRR (+30)	seasoned offerings	31	.12	.11	.06	.05	.30
TRR (–18)	seasoned offerings	31	.12	.09	.08	.05	.31
BETA (+30)	seasoned offerings	31	.86	.71	.50	.20	1.95
BETA (–30)	seasoned offerings	31	.75	.63	.47	.01	1.81

(continued)

Table 2. (continued)

Variable	*Sample*	N	M	*Median or %*[a]	SD	*Min.*	*Max.*
Measures of severe declines in stock price							
FAIL1(+30)	all prospectuses	80		10%			
FAIL5(+30)	all prospectuses	80		25%			
FAIL75(+30)	all prospectuses	80		20%			
FAIL50(+30)	all prospectuses	80		43%			
Control variables							
SIZE	all prospectuses	90	5.61	5.34	1.62	2.90	9.80
IND	all prospectuses	90		39%			
IPO	all prospectuses	90		54%			
SIZE	seasoned offerings	31	6.45	6.49	1.64	3.51	9.80
IND	seasoned offerings	31		21%			

Note: Variable definitions:
RDS1 = risk disclosure score 1;
TRR(+T) = future total return risk, calculated using T observations of monthly stock returns after publication of the prospectus;
BETA(+T) = future systematic risk, calculated using T observations of monthly stock returns after publication of the prospectus;
TRR(–18) = past total return risk, calculated using 18 observations of monthly stock returns before publication of the prospectus;
BETA(–30) = past systematic risk, calculated using 30 observations of monthly stock returns before publication of the prospectus;
FAIL1(+30) = indicator equal to one if stock price was below one Euro 30 months after publication of prospectus, and zero otherwise;
FAIL5(+30) = indicator equal to one if stock price was below five Euro 30 months after publication of prospectus, and zero otherwise;
FAIL75(+30) = indicator equal to one if stock price declined 75% or more over the 30-month period after publication of the prospectus, and zero otherwise;
FAIL50(+30) = indicator equal to one if stock price declined 50% or more over the 30-month period after publication of the prospectus, and zero otherwise;
SIZE = natural logarithm of the market value of the firm in million Euro one month after publication of the prospectus;
IND = indicator equal to one if the firm operates in a high-risk industry, and zero otherwise;
IPO = indicator equal to one if initial public offering, and zero otherwise.
a. Percentages are reported for indicator variables.

FAIL1(+30) shows that 30 months after publication of the prospectus, eight firms in the sample (10%) had a stock price that was lower than one Euro.

Panel A of Table 3 presents the correlations among the independent variables in the models tested. RDS1 was significantly positively correlated with SIZE ($p < .01$), IND ($p < .01$), IPO ($p < .05$), TRR(–18) ($p < .01$), and BETA(–30) ($p < .01$), suggesting that RDS1 reflected, to some extent, firm size, industry type, offering type, past total return risk, and past systematic risk. Panel A of Table 3 further shows that IPO firms in the sample were significantly smaller and significantly more often active in a high-risk industry ($p < .01$). As could be expected, firms in a high-risk industry had significantly higher past total return risk ($p < .01$) and significantly higher past systematic risk ($p < .01$). Despite the relatively high correlations among the independent variables, additional tests for multicollinearity showed no indication of any potential harmful effects in the multivariate regressions reported next.

Predicting TRR and BETA

Univariate results in Panel B of Table 3 show that RDS1 was significantly positively correlated with TRR(+T) up to 30 months after publication of the prospectus ($p < .01$) and with BETA(+30) ($p < .01$). This finding provides initial support for the idea that companies were actively providing risk-relevant information in risk sections. Compared to the correlation coefficient for TRR(–18), the coefficient for RDS1 was higher for months 6, 12, and 18 but lower for months 24 and 30. Compared to the correlation coefficient for BETA(–30), the correlation coefficient for RDS1 was also lower. For the purpose of illustration, Figure 1 divides the sample into three equal portfolios based on the ranking of RDS1 from low to high. For each portfolio, I plotted TRR(+T) up to 30 months after publication of the prospectus. As Figure 1 shows, the high RDS1 portfolio had consistently higher TRR than the low RDS1 portfolio. The difference was on average eight percentage points and was statistically significant for all months ($p < .01$).

Panel A of Table 4 presents the results of the multivariate regression analyses of Model 1 including control variables. To be able to assess the relative predictive ability of RDS1 against the control variables, I converted all variables to z scores and reported the standardized coefficients. All estimated regressions were significant ($p < .01$), and the adjusted R^2s

Table 3. Correlations Among Variables

Panel A: Correlations Among Independent Variables in Models 1 to 5

	Sample	N	*RDS1*	*SIZE*	*IND*	*TRR(–18)*
Models 1, 2, and 5						
SIZE	all prospectuses	90	.45***			
IND	all prospectuses	90	.35***	–.03		
IPO	all prospectuses	90	.25**	–.33***	.30***	
Models 3 and 4						
SIZE	seasoned offerings	31	.54***			
IND	seasoned offerings	31	.69***	.14		
TRR (–18)	seasoned offerings	31	.74***	.17	.78***	
BETA(–30)	seasoned offerings	31	.57***	.36*	.67***	.65***

Panel B: Correlations Among Dependent and Independent Variables in Models 1 to 5

	Sample	N	*RDS1*	*SIZE*	*IND*	*IPO*	*TRR(–18)*	*BETA(–30)*
Model 1								
TRR (+6)	all prospectuses	90	.57***	.17	.32***	.24**		
TRR (+12)	all prospectuses	89	.52***	.06	.53***	.24**		
TRR (+18)	all prospectuses	86	.57***	.05	.63***	.33***		
TRR (+24)	all prospectuses	84	.58***	.09	.64***	.33***		
TRR (+30)	all prospectuses	80	.52***	.05	.66***	.30**		
Model 2								
BETA (+30)	all prospectuses	80	.53***	.14	.63***	.18		

(continued)

Table 3. (continued)

	Sample	N	*RDS1*	*SIZE*	*IND*	*IPO*	*TRR(–18)*	*BETA(–30)*
Model 3								
TRR (+6)	seasoned offerings	31	.78***	.41**	.53***		.38**	
TRR (+12)	seasoned offerings	31	.79***	.48***	.69***		.49***	
TRR (+18)	seasoned offerings	31	.80***	.39**	.81***		.75***	
TRR (+24)	seasoned offerings	31	.66***	.32*	.72***		.72***	
TRR (+30)	seasoned offerings	31	.65***	.28	.73***		.74***	
Model 4								
BETA (+30)	seasoned offerings	31	.70***	.40*	.48**			.84***
Model 5								
FAIL1(+30)	all prospectuses	80	.46***	.07	.33***	.15		
FAIL5(+30)	all prospectuses	80	.33***	–.04	.45***	.22**		
FAIL75(+30)	all prospectuses	80	.37***	–.05	.58***	.18*		
FAIL50(+30)	all prospectuses	80	.31***	–.04	.36***	.10		

Note: Variable definitions:
RDS1 = risk disclosure score 1;
TRR(+T) = future total return risk, calculated using T observations of monthly stock returns after publication of the prospectus;
BETA(+T) = future systematic risk, calculated using T observations of monthly stock returns after publication of the prospectus;
TRR(–18) = past total return risk, calculated using 18 observations of monthly stock returns before publication of the prospectus;
BETA(–30) = past systematic risk, calculated using 30 observations of monthly stock returns before publication of the prospectus;
FAIL1(+30) = indicator equal to one if stock price was below one Euro 30 months after publication of prospectus, and zero otherwise;
FAIL5(+30) = indicator equal to one if stock price was below five Euro 30 months after publication of prospectus, and zero otherwise;
FAIL75(+30) = indicator equal to one if stock price declined 75% or more over the 30-month period after publication of the prospectus, and zero otherwise;
FAIL50(+30) = indicator equal to one if stock price declined 50% or more over the 30-month period after publication of the prospectus, and zero otherwise;
SIZE = natural logarithm of the market value of the firm in million Euro one month after publication of the prospectus;
IND = indicator equal to one if the firm operates in a high-risk industry, and zero otherwise;
IPO = indicator equal to one if initial public offering, and zero otherwise.
*$p < .10$. **$p < .05$. ***$p < .01$.

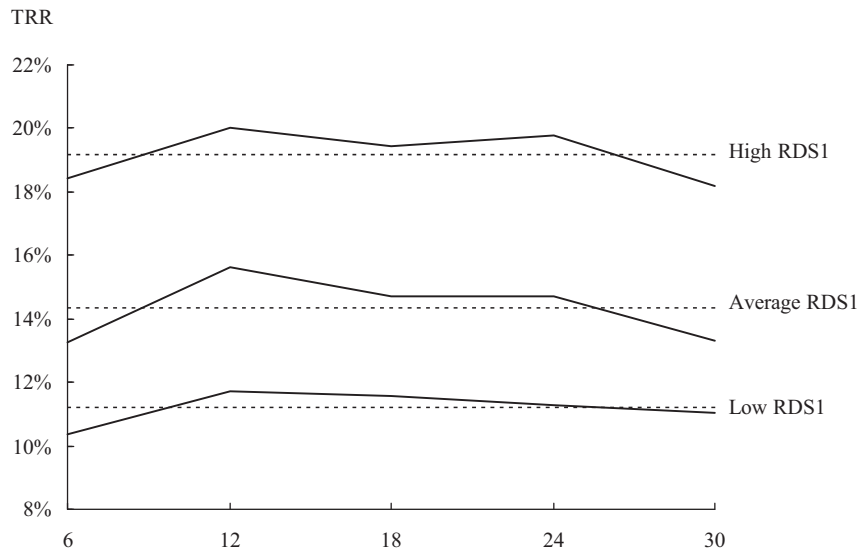

Figure 1. Average Total Return Risk (TRR) of Three Portfolios Chosen on the Basis of the Ranking of Risk Disclosure Score 1 (RDS1)

range from 30% to 54%. RDS1 remained significantly positively associated with TRR(+T) up to 30 months after publication of the prospectus ($p < .01$), showing that RDS1 was successful in predicting TRR(+T) in addition to the control variables. The magnitude of the standardized coefficients further shows that RDS1 had more predictive value than SIZE and IPO, whose coefficients were not significantly different from zero. Until month 18, RDS1 also had more predictive value than IND; thereafter, the standardized coefficients for IND were higher than for RDS1.

Panel C of Table 4 presents the results of the multivariate regressions of Model 2. Again, standardized coefficients are reported. The estimated model was significant ($p < .01$), and the adjusted R^2 was 46%. RDS1 was significantly positively associated with BETA(+30) ($p < .01$). Hence, RDS1 predicted future BETA in addition to the control variables. The magnitude of the standardized coefficients further indicates that RDS1 had more predictive value than SIZE and IPO (whose coefficients were not significantly different from zero) but less than IND.

Table 4. Ordinary Least Squares Regression Results of Models 1 to 4 Including Control Variables

Panel A: Regression Results Model 1 $TRR(+T) = \beta_0 + \beta_1 RDS1 + \beta_2 SIZE + \beta_3 IND + \beta_4 IPO + \varepsilon$

Dependent Variable	*Sample*	N	*Estimated Standardized Coefficients* β_1	β_2	β_3	β_4	F *Value*	*Adjusted* R^2
TRR(+6)	all prospectuses	90	.47***	–.01	.14	.01	8.93***	30%
TRR(+12)	all prospectuses	89	.46***	–.14	.38***	–.05	12.05***	38%
TRR(+18)	all prospectuses	86	.47***	–.08	.45***	.05	19.77***	53%
TRR(+24)	all prospectuses	84	.45***	–.04	.47***	.08	20.62***	54%
TRR(+30)	all prospectuses	80	.39***	–.05	.52***	.08	17.60***	53%

Panel B: Regression Results Model 3 $TRR(+T) = \beta_0 + \beta_1 RDS1 + \beta_2 TRR(-18) + \beta_3 SIZE + \beta_4 IND + \varepsilon$

Dependent Variable	*Sample*	N	*Estimated Standardized Coefficients* β_1	β_2	β_3	β_4	F *Value*	*Adjusted* R^2
TRR(+6)	seasoned offerings	31	.64***	–.29	–.15	.41**	10.26***	62%
TRR(+12)	seasoned offerings	31	.50***	–.25	.05	.58**	13.67***	69%
TRR(+18)	seasoned offerings	31	.43***	.08	–.06	.50***	21.59***	79%
TRR(+24)	seasoned offerings	31	.34**	.05	–.07	.62***	17.51***	75%
TRR(+30)	seasoned offerings	31	.30**	.06	–.09	.63***	15.60***	72%

(continued)

Table 4. (continued)

Panel C: Regression Results Model 2 $BETA(+30) = \beta_0 + \beta_1 RDS1 + \beta_2 SIZE + \beta_3 IND + \beta_4 IPO + \varepsilon$

Dependent Variable	*Sample*	N	*Estimated Standardized Coefficients* β_1	β_2	β_3	β_4	F *Value*	*Adjusted* R^2
BETA(+30)	all prospectuses	80	.33***	.08	.51***	.00	13.27***	46%

Panel D: Regression Results Model 4 $BETA(+30) = \beta_0 + \beta_1 RDS1 + \beta_2 BETA(-30) + \beta_3 SIZE + \beta_4 IND + \varepsilon$

Dependent Variable	*Sample*	N	*Estimated Standardized Coefficients* β_1	β_2	β_3	β_4	F *Value*	*Adjusted* R^2
BETA(+30)	seasoned offerings	31	.76***	.54***	–.14	–.05	7.76***	60%

Note: Variable definitions:
RDS1 = risk disclosure score 1;
TRR(+T) = future total return risk, calculated using T observations of monthly stock returns after publication of the prospectus;
BETA(+T) = future systematic risk, calculated using T observations of monthly stock returns after publication of the prospectus;
TRR(–18) = past total return risk, calculated using 18 observations of monthly stock returns before publication of the prospectus;
BETA(–30) = past systematic risk, calculated using 30 observations of monthly stock returns before publication of the prospectus;
SIZE = natural logarithm of the market value of the firm in million Euro one month after publication of the prospectus;
IND = indicator equal to one if the firm operates in a high-risk industry, and zero otherwise;
IPO = indicator equal to one if initial public offering, and zero otherwise.
*$p < .10$. **$p < .05$. ***$p < .01$.

Panel B of Table 4 presents the results of the multivariate regressions of Model 3. Again, all regressions were significant ($p < .01$), and the adjusted R^2s ranged from 62% to 79%. RDS1 was significantly positively associated with TRR(+T) up to 30 months after publication of the prospectus ($p < .05$). The standardized coefficients of TRR(–18) were not significantly different from zero, indicating that RDS1 had more predictive value than past TRR. The findings further show that RDS1 had more predictive value than SIZE (whose coefficients were not significantly different from zero) but less than IND (whose coefficients were significantly positive and, except for month 6, higher than the coefficients of RDS1).

Panel D of Table 4 presents the results of the multivariate regressions of Model 4. The model was significant ($p < .01$), and the adjusted R^2 was 60%. Both RDS1 and BETA(–30) were significantly positively associated with BETA(+30) ($p < .01$). However, the magnitude of the standardized coefficient for BETA(–30) was lower than for RDS1, indicating that RDS1 had more predictive value than past systematic risk. RDS1 also had more predictive value than SIZE and IND, whose coefficients were not significantly different from zero.

In sum, the results for Models 1 to 4 show that RDS1 was successful in predicting future total return risk and future systematic risk. These results provide strong support for the idea that companies were generally providing risk-relevant information in risk sections. Furthermore, the information in the risk sections appears to be more relevant than past total return risk and past systematic risk. The latter finding provides additional support for the view that the information in risk sections reflected material risks to an investment in the issuers' securities.

Predicting FAIL

Univariate results in Panel B of Table 3 show that RDS1 was significantly positively correlated with FAIL1(+30) and FAIL5(+30) ($p < .01$). These results provide initial support for the notion that the information in risk sections warns for the possibility of large negative outcomes.

Furthermore, the information in the risk sections appears to be more relevant than past total return risk and past systematic risk.

Table 5 presents the results of logistic regressions of Model 5. The model's chi-squares were significant ($p < .01$), and RDS1 remained significantly positively correlated with FAIL1(+30) and FAIL5(+30) ($p < .01$ and $p < .05$, respectively). This result further confirmed the relevance of the forward-looking risk information. Nagelkerke's pseudo R^2 was 48% and 36% for FAIL1(+30) and FAIL5(+30), respectively. In addition to a higher pseudo R^2, the model for FAIL1(+30) had a higher coefficient for RDS1 than the model for FAIL5(+30). Hence, RDS1 appeared to be better at predicting more extreme stock price failures.

Overall, the results for Model 5 show that RDS1 was successful in predicting future stock price failures, especially the more extreme ones. This provides further support for the view that the information in risk sections reflected material risks to an investment.

Supplementary Analysis

The main analyses focus exclusively on RDS1. Alternatively, I included all three component scores in Models 1 to 5 and performed all tests. For reasons of brevity, these results are not reported in tabular form. The results confirmed the associations reported for RDS1 but provided no evidence that RDS2 or RDS3 were associated with TRR(+T), BETA(+30), or FAIL(+30). While this indicates that disclosure of risk factors represented by RDS2 and RDS3 was not useful for predicting total return risk, systematic risk, and severe declines in stock price, it does not preclude that these risk factors conveyed other information relevant to investors.

From the texts analyzed in this study, 67% were written in English and 33% in Dutch. Using moderated regression analysis, I further analyzed whether the language in which the prospectus was written significantly affected the reported associations between RDS1 and TRR(+T), BETA(+30), and FAIL(+30). The results (not reported in tabular form) showed no systematic difference, suggesting that language did not influence the informativeness of the risk sections.

Robustness Checks

When coding the texts of the risk sections, I alternatively identified for each text how often each risk factor was present (instead of whether the risk factor was present or not). The component scores that result from using the counts per risk factor were almost identical (correlation coefficients > .98 with $p < .01$), and the results of all empirical tests were robust to using these component scores.

Table 5. Logistic Regression Results of Model 5 Including Control Variables

Regression Results Model 5 $FAIL(+30) = \beta_0 + \beta_1 RDS1 + \beta_2 SIZE + \beta_3 IND + \beta_4 IPO + \varepsilon$

Dependent Variable	*Sample*	N	*Estimated Coefficients* β_1	β_2	β_3	β_4	χ^2	*Nagelkerke Pseudo* R^2
FAIL1(+30)	all prospectuses	80	1.93***	–.90	2.38*	–.31	21.37***	48%
FAIL5(+30)	all prospectuses	80	.82**	–.39	1.88***	.13	23.19***	36%
FAIL75(+30)	all prospectuses	80	1.61***	–1.02**	4.05***	–.59	40.10***	60%
FAIL50(+30)	all prospectuses	80	.87**	–.38	1.24**	–.70	18.10***	26%

Note: Variable definitions:
RDS1 = risk disclosure score 1;
FAIL1(+30) = indicator equal to one if stock price was below one Euro 30 months after publication of prospectus, and zero otherwise;
FAIL5(+30) = indicator equal to one if stock price was below five Euro 30 months after publication of prospectus, and zero otherwise;
FAIL75(+30) = indicator equal to one if stock price declined 75% or more over the 30-month period after publication of the prospectus, and zero otherwise;
FAIL50(+30) = indicator equal to one if stock price declined 50% or more over the 30-month period after publication of the prospectus, and zero otherwise;
SIZE = natural logarithm of the market value of the firm in million Euro one month after publication of the prospectus;
IND = indicator equal to one if the firm operates in a high-risk industry, and zero otherwise;
IPO = indicator equal to one if initial public offering, and zero otherwise.
*$p < .10$. **$p < .05$. ***$p < .01$.

Although all firms in the sample were incorporated in the Netherlands and their securities were traded on the Amsterdam Stock Exchange, 31% of the companies in the sample had a cross-listing at a foreign stock exchange, typically in the United States (NYSE or NASDAQ) or in the United Kingdom (London Stock Exchange). Likely, these firms faced more rigorous disclosure requirements. To mitigate potential doubts about the homogeneity of the sample resulting from different regulatory environments, I additionally included in all regressions separate indicator variables to control for a cross-listing at the NYSE, the NASDAQ, and the London Stock Exchange. The results (not reported in tabular form) show that the inclusion of these indicators did not qualitatively change the results for the variables of interest (i.e., the reported findings were not biased due to their omission). Reported results were also robust to adding several other additional control variables in all models (not reported in tabular form), including (a) an indicator for the language in which the prospectus was written, (b) indicators for the year or quarter in which the securities were offered, (c) indicators for companies active in the manufacturing and trade sector, (d) the book-to-market ratio of equity, and (e) financial leverage.

To further check the robustness of the findings, the tests for the full sample were also performed for subsamples of high-risk industries and low-risk industries. The results (not reported in tabular form) show that the associations between RDS1 and TRR(+T), BETA(+30), and FAIL(+30) remained intact. Findings were also robust to excluding any specific quarter in which the securities were offered from the sample. To check the robustness of the results of Models 2 and 4 for the calculation of BETA, I excluded the last year of security issues from the sample and calculated BETA(+42). Using BETA(+42) instead of BETA(+30) led to identical conclusions. To check the robustness of the results of Model 5 for the definition of future stock price failure, I alternatively calculated severe stock price declines of more than 50% or more than 75% over a 30-month period. These extreme negative returns are labeled FAIL50(+30) and FAIL75(+30), respectively. The results, which are presented in Panel B of Table 3 and in Table 5, led to identical conclusions.

CONCLUSION

In this article, I examined whether narrative risk disclosures in prospectuses generally contain risk-relevant information for prospective investors. The data that I used were obtained from a sample of 90 prospectuses of

Dutch firms raising capital on the Amsterdam Stock Exchange in the late 1990s. To obtain an aggregate measure of risk from the information in the texts, I performed a detailed content analysis of the risk sections in the prospectuses. The content analysis revealed that management mostly assigns the label "risk" to a multitude of factors, either internal or external to the firm, that can adversely impact future firm performance and can cause future operating results and stock prices to be volatile. The results of further empirical tests showed that an aggregate measure of risk obtained by the content analysis successfully predicts the following:

- future total return risk (volatility of future stock prices);
- future systematic risk (sensitivity of future stock prices to market-wide fluctuations); and
- the likelihood of severe declines in stock price in the 30-month period after publication of the prospectus.

Notably, these results held when controlling for several other factors, including firm size, type of industry, type of offering, cross-listing at a foreign exchange, and the language in which the prospectus was written. The results further showed that when it comes to predicting future risk, the information extracted from the texts is more successful than market information on past risk. I conclude from these findings that prospectuses of Dutch firms in general clearly contain risk-relevant information for prospective investors.

Limitations

The findings should be interpreted with some limitations in mind relating to the statistical reduction of the data, which was required to obtain an aggregate measure of risk. First, due to the exploratory nature of the technique, it is unclear what caused the different dimensions in the data. This fact makes it difficult to put a label on the component scores. Second, several risk factors identified in the texts did not load significantly on any of the three dimensions resulting from the data reduction. Basically, this implies that these risk factors could not be measured reliably in this study. Consequently, I can draw no conclusions about the potential relevance of these risk factors. Third, while the findings suggest that the risk factors represented by RDS2 and RDS3 were not helpful for predicting future total return risk, systematic risk, and large declines in stock price, it is unclear whether they are useless to investors or contain relevant information about other future outcomes that are not examined in this study. Due

to these limitations, I believe the findings provide a conservative assessment of the information content of risk sections.

More generally, a limitation of the study is that it exclusively focuses on *what* the risk sections contain. Further research is needed to gain a better understanding of *how* risks are disclosed and *why*. Concerning the latter question, in a related study on the economic incentives for voluntary reporting on internal risk management and control systems, Deumes and Knechel (in press) show that Dutch-listed companies disclose less information when they face fewer information and agency problems, as proxied for by the degree of ownership concentration, managerial ownership, and financial leverage. Future research could investigate if these factors also influence the quantity and quality of risk disclosure.

Implications

For corporate communication researchers, a potential implication of this study is that it requires rethinking the role of corporate communication. Seemingly grounded in uncertainty reduction theory (Berger & Calabrese, 1975), Kohut and Segars (1992) posit that a major goal of communicators is to reduce the audience's uncertainty through language and information. According to Brashers (2001), this traditional and more narrow conceptualization of communication in uncertainty reduction has long dominated communication research. In his view, "the field's historic focus on uncertainty *reduction* is both a cause and symptom of underdeveloped ideas about uncertainty and methods of managing it" (p. 478).[15] In the context of corporate risk reporting, a better way to think about the role of corporate communication may be to revise constituencies' perceptions of uncertainty. For example, as soon as managers obtain inside information about new and major risks threatening the company, they may desire to communicate this to investors in order to warn them by increasing investors' perception of uncertainty. For example, managers may decide to point out to investors that details of the company's situation are more ambiguous, more complex, more unpredictable, and more probabilistic than investors may be aware of or that investors should not be overconfident about their state of knowledge because certain information is unavailable to outsiders or simply inconsistent. By doing so, managers can make it less likely that they later suddenly fail investors' expectations of what their company can (or cannot) provide or achieve. This strategy can protect both companies' and managers' long-term reputation. At other times, managers may want to send reassuring messages in order to decrease investors' perceptions of uncertainty, for example,

if a previously communicated threat ceases to exist. In a broader sense, the same principle arguably applies to corporate communication with other constituencies, such as customers, employees, and communities, on health, safety, and environmental risks, for example.

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An important implication of the findings for financial communication practitioners is that risk disclosure in prospectuses can be viewed as an area of best practice when it comes to corporate risk communication. Analyzing Enron's demise, Seeger and Ulmer (2003) conclude that openness to signs of problems is a key communication-based responsibility of companies. The findings of this study suggest that maintaining prospectus standards of risk disclosure in, for example, annual and quarterly reports can help companies to fulfill this responsibility. For financial regulators, an implication of this study is that current requirements for risk factor disclosure in prospectuses seem to be effective.

Future Research

In the United States, the Securities and Exchange Commission (SEC) has long required companies to disclose risk factors in registration statements. As from December 2005, the requirement to disclose risk factors also applies to annual reports. Furthermore, companies must update the risk factor section in their quarterly reports to reflect material changes from previously disclosed risk factors (SEC, 2005). Despite these developments in practice, our understanding of the role of risk disclosure in corporate communication is limited. For example, how are the risks disclosed in terms of readability, linguistic structure, or rhetorical elements? What is the understandability and significance of risk factor disclosure to different groups of investors and other constituencies? What is the comparability of risk factor disclosure across countries, companies, and across time? What are companies' motivations for risk factor disclosure? What explains companies' choice of the level of risk factor disclosure? Does risk factor disclosure alter

investors' perceptions of uncertainty and/or investment decisions? How does risk factor disclosure impact on companies' stock price, cost of capital, and reputation? These are important but also difficult questions to investigate. Because the questions extend beyond the boundaries of corporate communication research, some of them will be best considered in collaboration with researchers in other fields, particularly accounting and finance.

NOTES

1. Contemplating the past, present, and future of business communication research, Janis Forman recognized the need to align the field more clearly with a business function, like corporate communication, which is becoming increasingly important in business organizations (Suchan & Charles, 2006). This suggestion echoes Argenti (1996), who, in an effort to define corporate communication as a discipline, distinguishes various subfunctions of corporate communication, including financial communication. The latter subfunction, also called investor or shareholder relations, deals with the financial media, financial analysts, and investors.

2. In essence, security prices equal expected discounted payoffs. In valuing securities, investors account for the delay and for the risk of its payoffs. While the effect of time is not difficult to figure out, corrections for risk are usually much more important and challenging (Cochrane, 2005).

3. Market risk is defined in these studies as the risk of loss arising from adverse changes in interest rates, foreign currency rates, commodity prices, and equity prices (Securities and Exchange Commission, 1997).

4. Finding no association would suggest that managers are unable or unwilling to disclose the right information. Lacking clear theoretical predictions, I formulate no expectations. Essentially, the goal of testing the associations is to explore what is disclosed in risk factor sections. Factual evidence on this issue is limited and can help raising questions and hypotheses for further research on how and why risk factors are disclosed.

5. In this period, 94 firms issued securities on the Amsterdam Stock Exchange. I could not retrieve the prospectus for 4 firms.

6. There were no differences in mandatory requirements among the different types of security offerings investigated.

7. In terms of market liquidity, an important aspect of stock market development, the Netherlands ranks among the top of the Organisation for Economic Co-operation and Development (OECD) countries (Bortolotti, de Jong, Nicodano, & Schindele, 2007).

8. Only Simunic and Stein (1987) report that since the reporting requirements are rather general and allow considerable latitude in the nature, degree, and form of disclosure, they initially (but unsuccessfully) tried to classify the risk factors as they appeared in the prospectus in categories.

9. See Didow, Keller, Barksdale, and Franke (1985) for a presentation of the general form of the PRINCIPALS transformation and an illustration of its usefulness in the context of attitude research.

10. The slope coefficient β_1 in all models is central to the analysis. The variable ε is called the error term in the relationship and represents other factors that affect the explained variable. The intercept parameter β_0 is not relevant.

11. Alternatively, I included four indicator variables to control for each offering type. This led to identical conclusions for all analyses.

12. March and Shapira (1987) point out that managers associate risk primarily with negative outcomes and do not treat uncertainty about positive outcomes as an important aspect of risk.

13. In accordance with managers' focus on negative outcomes, Baird and Thomas (1990) and Olsen (1997) find that investors view risk as size of loss or potential for loss rather than as variance of returns. Additionally, investors associate risk with lack of information and lack of control.

14. The total amount of variance to be explained (the "trace") is equal to the total number of risk factors (i.e., 48). The eigenvalues represent the amount of variance accounted for by each dimension. Larger eigenvalues indicate dimensions that are of more importance in the overall solution. The percentage of variance accounted for by each dimension is equal to the eigenvalue divided by the trace.

15. See Bradac (2001) for a discussion of several theories that examine the role of communication in producing and coping with subjective uncertainty.

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